

REMARKS

Claims 1-26 and 28-62 are pending in the application. Claims 1-26 and 28-62 stand rejected. Independent claims 1, 32, and 62 are being amended. Dependent claims 2-4, 16, and 22-25 are also being amended. No new matter is believed introduced by way of the amendments.

On page 4 of the present Office Action, Applicants are asked to provide a copy of inventor Chandran's Masters Thesis. Applicants are in the process of locating a copy of this reference and request an extension of time while trying to do so.

Rejections Under 35 U.S.C. §112, Second Paragraph

Claims 2-4, 16-18, and 22-25 were rejected under 35 U.S.C. §112, second paragraph as being indefinite. Corrections to claims 2-4, 16-18, and 22-25 have been made in the Claim Listing above. Claims 5-7 and 17-18 depend from now amended claims 4 and 16. Accordingly, claims 2-4, 16-18, and 22-25 are believed to have overcome the rejection under 35 U.S.C. 112, second paragraph. Therefore, Applicants respectfully request withdrawal of the rejections.

Rejections Under 35 U.S.C. §102(e)

Claims 1-4, 7, 12, 15-16, 18-19, 21-22, 32-35, 38, 43, 47, 50, 52-53, and 62 were rejected under 35 U.S.C. §102(e) as being unpatentable over Rabipour *et al.* (U.S. Patent Number 6,011,846), hereinafter referenced as "Rabipour."

Claim 1 as amended in the Claim Listing above recites:

In a communications system for transmitting a near end digital signal using a compression code comprising a plurality of parameters including a first parameter, said parameters representing an audio signal comprising a plurality of audio characteristics, said compression code being decodable by a plurality of decoding-procedures, said communications system also transmitting a far end digital signal using a compression code, apparatus for reducing echo in said near end digital signal comprising:

a reading unit responsive to said near end digital signal to read at least said first parameter of said plurality of parameters,

a decoder to perform at least one of said plurality of decoding procedures on said near end digital signal and said far end digital signal and generate at least partially decoded near end signals and at least partially decoded far end signals,

responsive to said at least partially decoded near end signals and at least partially decoded far end signals, an adjustment unit to adjust said first parameter to generate an adjusted first parameter,

an echo likelihood estimator to estimate ~~the~~ an echo likelihood in said near end signal as a function of a ratio of powers of the near end signal and the far end signal;

responsive to said echo likelihood estimate, a replacement unit to replace at least said first parameter with said adjusted first parameter in said near end digital signal to reduce echo in the near end digital signal, and

a transmitter to transmit said near end digital signal with reduced echo.

In the above amended claim, the strikethrough words indicate elements being deleted by way of amendment, and the underlined words indicate elements being added by way of amendment. Support for the amendment is found in the specification as originally filed at least on page 20, lines 1-4 and also in reference to Applicants' Fig. 13, direct modification of coded parameters based on the echo likelihood is illustrated. The algorithm 44 reads at least a first of the parameters received at terminal 20. Partial decoders at least partially decode the far-end and near-end signals. The echo likelihood signal is generated by at least estimating the amount of echo in the near-end signal. The echo likelihood is estimated for each speech subframe and is used by the algorithm 44 to adjust the parameters read by algorithm 44. In order to calculate the echo likelihood estimation, a function of a power ratio of the near end and far end signals is used (see page 20 for calculation of R as a function of the aforementioned power ratio and page 21 for calculation of ρ_i (initial likelihood), ρ (likelihood) as a function of R). Thus, Applicants' invention as claimed in amended Claim 1 estimates the echo likelihood for each frame of the near-end signal as a function of the power ratio of the near end and far end signals and creates an adjusted near-end signal responsive to estimates of the amount of echo (i.e., echo likelihood) in the near-end signal.

In contrast, Rabipour applies a simpler technique of applying echo suppression, which makes a decision regarding the adjustment of the parameters of a frame by estimating the energy of echo based on comparing the energy within a spectrum. Specifically, Rabipour calculates the variances of the near-end and far end spectra for the current frame (see Fig. 3) and compares their covariance against a predetermined threshold to declare an echo or a no-echo condition with certainty (column 5 line 29 – column 6, line 11).

Thus, Applicants' invention as claimed in amended Claim 1 distinguishes over Rabipour in that it "estimate[s] an echo likelihood in said near end signal as a function of a ratio of powers of the near end signal and the far end signal," in contrast to Rabipour's obtaining the cross-covariance of the near-end signal.

and far end spectra and compares the obtained value against a predetermined threshold to declare echo with certainty.

In view of the foregoing, Applicants respectfully submit that Claim 1 as now amended overcomes the rejection under 35 U.S.C. §102(e).

Independent Claims 32 and 62 are being amended in the Claim Listing above to include similar elements as now amended Claim 1 and should be allowed for similar reasons.

Because Claims 2-4, 7, 12, 15-16, 18-19, and 21-22 depend from amended claim 1 and Claims 32-35, 38, 43, 47, 50, and 52-53 depend from amended claim 32, Applicants respectfully submit that these claims should be allowed for at least the same reasons as the base claims from which they depend.

Rejections Under 35 U.S.C. §103(a)

Claims 5-6, 13-14, and 36-37 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Strawczynski *et al.* (U.S. Patent Number 6,138,022), hereinafter referenced as "Strawczynski."

Claims 8-9 and 39-40 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Gritton *et al.* (U.S. Patent Number 5,857,167), hereinafter referenced as "Gritton."

Claims 10-11, 20, 23-25, 41, 42, 46, 49, 51 and 54-46 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Chen *et al.* (U.S. Patent Number 5,651,091), hereinafter referenced as "Chen."

Claim 17 was rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Christensson *et al.* (U.S. Patent Number 6,510,224), hereinafter referenced as "Christensson."

Claims 26, 28-31, and 57-61 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Applicants' Admitted Prior Art, hereinafter referenced as "AAPA."

Claims 44-45 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Chen and further in view of Strawczynski.

Claim 48 was rejected under 35 U.S.C. §103(a) as being unpatentable over Rabipour in view of Chen and further in view of Christensson.

These rejected claims are dependent from amended Claims 1 or 32. As explained in the previous section, Rabipour does not teach all of the elements recited in now amended base Claims 1 and 32, namely, estimating the echo likelihood for each frame and adjusting the near-end signal in response to the estimated echo likelihood measure. The shortcomings of Rabipour as presented above are not cured by Strawczynski, Gritton, Chen, Christensson, or AAPA. Therefore, without discussing the merits of the reasons behind the rejection of the above-listed dependent claims under 35 U.S.C. § 103(a), it is Applicants' position that these claims are allowable over Rabipour in view of Strawczynski, Gritton, Chen, Christensson, and AAPA. Accordingly, Applicants respectfully request that the rejections under 35 U.S.C. § 103(a) be withdrawn.

Supplemental Information Disclosure Statement

A Supplemental Information Disclosure Statement (SIDS) is being filed concurrently herewith. Entry of the IDS is respectfully requested.

CONCLUSION

In view of the above amendments and remarks, it is believed that all now pending claims, claims 1-26 and 28-62, are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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